



Great Public Schools for Every Child

STATEMENT OF

REBECCA PRINGLE

ON BEHALF OF

THE NATIONAL EDUCATION ASSOCIATION

BEFORE THE

COMMITTEE ON SCIENCE

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REBECCA PRINGLE

Executive Committee

NATIONAL EDUCATION ASSOCIATION

Rebecca "Becky" Pringle, an eighth grade physical science teacher from Harrisburg, Pennsylvania, was elected to a second 3- year term on the National Education Association's nine-member Executive Committee in July 2004.

A middle school teacher with 30 years' classroom experience, Pringle has held Association positions at the national, state, and local levels. For the past five years, she has served on the Board of Directors of the NEA. She has also served on the Pennsylvania State Education (PSEA) Association's Board.

Pringle's long history of leadership has included attention to diversity issues, student achievement, and developing leaders within the Association. She chaired the PSEA Human and Civil Rights Award Committee, the PSEA Task Force on Minority Representation, and the Strategic Planning Committee on Diversity for her local Susquehanna Township School District. In addition, she served as regional chair of the PSEA Leadership Development Committee and on the Institute for Educational Leadership Task Force.

Since being elected to her post on the Executive Committee for NEA, Pringle has served on the NEA's Women's Issues Committee, Distance Learning Task Force and both the National and State Media Advisory Groups. With the passage of the 2002 reauthorization of the Elementary and Secondary Education Act, Pringle has become a leader in the organization as chair of NEA's ESEA Advisory Committee. She also serves on the National Board for Professional Teaching Standards.

Pringle has been active in the area of literacy and served as the chair of NEA's Reading Task Force. As a member of NEA's Professional Standards and Practices Committee, she provided leadership in the development of the Committee's report on "Excellence and Equity: Closing the Student Achievement Gaps." She has been honored with the Pennsylvania Academy for the Profession of Teaching Award, and AAUW's Harrisburg Community Woman of the Year Award. Pringle currently teaches at Susquehanna Township Middle School.

A Philadelphia native, Pringle received her Bachelor of Science degree in elementary education from the University of Pittsburgh in 1976. She earned a Master's of Education from Pennsylvania State University in 1989. She and her husband, Nathan, live in Harrisburg. Their son, Nathan III, a graduate of Drexel University, lives in Philadelphia, and their daughter, Lauren, is a recent graduate of New York University.

The NEA Executive Committee comprises the three NEA executive officers plus six members elected at large.

Mr. Chairman and Members of the Committee:

My name is Becky Pringle and I am a member of the Executive Committee of the National Education Association. I thank you for the opportunity to speak with you today about the critical issues involved in improving math and science education in our nation's elementary and secondary schools.

This is a timely and important issue, not only because the 2007-08 school year marks the beginning of required science testing under No Child Left Behind, but, most especially, because we know that for our nation to position itself at the forefront of an increasingly global society, we must equip our students today with the 21st century math and science skills they will need to lead the way tomorrow.

I speak to you today as an NEA leader, representing NEA's 2.8 million members. But, I also come to you as an eighth grade science teacher with 30 years of classroom experience. As a science teacher, I am passionate about ensuring the highest quality math and science education so that all of our students can compete successfully in the global economy. And, I am equally passionate in my belief that a highly skilled math and science teaching force, knowledgeable in both subject matter and pedagogy, is the most important factor in improving math and science education.

My testimony today will highlight the importance of focusing resources on professional development to improve math and science education and the critical role the National Science Foundation (NSF) can play in these efforts.

A Focus on Professional Development

NEA believes that improving professional development is the single most critical factor in strengthening math and science education. No single change will make a bigger difference in helping students reach high academic standards than ensuring quality teachers. Therefore, the first priority for improving K-12 math and science education should be to address the education of new teachers and provide professional development programs to improve continuously the capabilities of current math and science teachers.

Given the clear link between teacher quality and student learning, we are disappointed that the Administration's proposal for improving math and science education focuses overwhelmingly on developing math curricular materials for elementary and middle schools. In fact, 70 percent of the proposed funding would go toward these efforts. While ensuring rigorous curricula is certainly an important part of strengthening math and science education, we believe this allocation of resources will not offer the most effective approach to reaching the intended goal. Rather, we would recommend redirecting resources to focus primarily on professional development and training for teachers.

Quality professional development programs focus both on content and pedagogy. Improving subject matter knowledge and pedagogical knowledge are equally important in preparing math and science teachers. Effective teachers have a deep knowledge of their subject matter and are equally skilled at using appropriate strategies to teach that knowledge to students. Understanding content is essential. Educators with a breadth and depth of content knowledge are the foundation for excellent math and science teaching and learning. However, it is also important to know how children learn, how different children learn differently, and how to tailor instruction accordingly. Our increasingly diverse classrooms demand that teachers understand a

number of ways of providing instruction to students. For example, students with learning disabilities, or those for whom English is a second language, may require instruction delivered in a different way than their peers.

I teach middle school. No one knows better than teachers of middle level learners that lessons must be developed and adjusted to address the different stages of cognitive developmental levels as well as learning styles. With students who seemingly change from moment to moment, we must have the knowledge and skills to adapt our teaching methods to convey difficult concepts like Bernoulli's Principle. We must have strategies and tools that allow us to help students make science connections with their world by relating, for example, Newton's 2nd Law of Motion ($F=ma$) to their batting practice. It was through professional development opportunities that I learned and developed techniques to bring science alive for my students, so they could understand both the content and its relevance.

Attached to this testimony are some general guidelines that NEA believes exemplify quality professional development for teachers. These guidelines—including language from the current Elementary and Secondary Education Act and standards developed by the National Staff Development Council—are applicable to the sort of training we believe is essential to ensure excellent K-12 math and science education. For example, quality professional development:

- Focuses on both content and pedagogy;
- Is sustained, intensive, and classroom-focused;
- Aligns with state and local goals and standards;
- Prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement;
- Provides educators with knowledge and skills to involve families and other stakeholders appropriately; and
- Addresses different levels of professional development, including individual, school, district, and state. NSF has historically funded a variety of program aimed at each of these levels.

The Role of the National Science Foundation

NEA believes that NSF should be a major player in any federal initiative to improve K-12 math and science education, and we are concerned that the Administration's competitiveness initiative does not include NSF as a significant partner. The Administration's budget request would actually cut NSF's K-12 programs by about seven percent. In fact, between FY 2004 and the FY 2007 request, funding for the main NSF K-12 programs (Math and Science Partnerships, Instructional & Assessment Materials Development, and Teacher Development) has declined by nearly half, from \$283 million to \$150 million.

NSF is an ideal partner in improving math and science education. The Foundation has a long history of providing effective professional development for teachers; they understand the importance of developing and providing experiences that focus on both content and pedagogy. Nearly 50 years ago, NSF ran a Summer Institute Program that has been widely acknowledged as one of the most important steps in improving K-12 mathematics and science education. NSF has the infrastructure not only to seed, drive, and facilitate the use of developed mathematics and science curricula, but also the development and assessment of new curricula for the 21st century.

As an independent federal agency, NSF has the experience in leading research that can promote K-12 mathematics and science education. NSF's long history of funding and supporting research in a variety of disciplines is one to be proud of. For example, it is quite common to hear people say "just Google it," meaning to use a search engine to find out something of interest. What most people don't know, however, is that both founders of Google studied under an NSF funded faculty member. Clearly, NSF has played a leading role in advancing effective research.

NSF can use its experience of funding large-scale research studies at universities, foundations, school districts, and other institutions to improve K-12 science and math education. Currently, NSF promotes partnerships between and among Schools and Colleges of Education, Engineering, Mathematics, and Science, as well as local school districts.

The NSF Math and Science Partnership (MSP) awards competitive, merit-based grants to teams composed of institutions of higher education, local K-12 school systems, and their supporting partners. These partnerships develop and implement pioneering ways of advancing math and science education. The program is based on five pillars: Partnership-Driven, Teacher Quality, Quantity and Diversity, Challenging Courses and Curricula, Evidence-Based Design, and Institutional Change and Sustainability. It involves four components:

- Comprehensive partnerships, which implement change across the K-12 continuum in math and science;
- Targeted partnerships, focusing on improved student achievement in a narrower grade range or disciplinary focus in math and science;
- Institute partnerships, helping to develop math and science teachers as school- and district-based intellectual leaders and master teachers; and
- Research, Evaluation, and Technical Assistance activities assisting partnership awardees in the implementation and evaluation of their work.

The collaboration at universities between education, mathematics, science, and engineering faculty required by the MSP program takes advantage of the best universities and colleges have to offer. Partnerships such as the one I participated in focus on strengthening both the knowledge base of science teachers, as well as enhancing their pedagogical skills. I attended one such program at Lebanon Valley College that brought teachers from all over the Central Pennsylvania area together to review, update, and enhance our knowledge of the physics and chemistry principles contained in our state's science standards. We spent the week learning together, developing activity-based, hands-on lessons and labs for our students. The college was also able to provide teachers who did not have the resources in their school districts with materials and kits for use with their students.

NSF funding has also advanced the efforts of the National Science Teachers Association (NSTA) to provide professional development to science teachers nationwide. For example, as a participant in NSTA's national conferences, I was able to attend workshops that improved my practice, as well as learn about the ongoing research projects NSF was conducting to advance science education.

Additionally, members of NSTA, benefit from the research and information available to us because of NSF-funded activities. For example, NSTA's Science Program Improvement Review

(SPIR) program, which was designed to assess a school's complete science instructional program across all grade levels, helped schools and districts align science instruction more closely with state and national science standards for teaching, professional development, assessment, content, and program.

A five-year, \$12.5 million NSF initiative in Arizona, which began in 2004, offers a tuition-free program at Arizona State University providing teacher training to more than 100 educators. Teachers participating in the program take graduate-level integrated math and science classes. The program was designed not only to benefit those teachers taking part, but in its ongoing research efforts, NSF hopes to learn and share how professional development of teachers affects student achievement in math and science.

NSF supports programs that promote the kind of individual professional development plans NSTA recommends, ones that include a variety of opportunities to learn, practice, and enforce new behaviors through workshops and seminars that focus on immersion into inquiry science, and provide training in mentoring and coaching.

NSF and the Department of Education: A Partnership for Quality Math and Science Education

We believe that the National Science Foundation should focus on supporting professional development programs that take advantage of the research on adult learning. Teachers need sustained, long term professional development. Today, unfortunately, some teachers receive what they call “drive-in” professional development—quick and fulfilling only for a short time. These programs leave little time for teachers to reflect on their own learning, internalize and incorporate their new skills and knowledge into their teaching, and collaborate with and learn from their colleagues. Given their experience with programs such as the Math and Science Partnerships, NSF is uniquely qualified to promote and finance quality programs that will ensure effective professional development with long-term application.

NSF can also assist in the curriculum development aspect of math and science education. The foundation has had success with the development of mathematics curricula, but has lacked the funds to implement the curricula on a large scale. Therefore, we recommend that any initiatives to develop new curricula include resources both for development and implementation.

The Department of Education has a critical role to play in these efforts. We welcomed Secretary Spellings’ recent announcement of Teacher to Teacher regional workshops as an important addition to teacher professional development. We continue to believe, however, that professional development that is likely to promote long-term change and instructional improvement is more appropriately addressed by local universities, foundations, and school districts that can support year-long professional development experiences.

The Department of Education should focus on gathering information about programs that work and disseminating this information to state and local agencies. On a larger scale, the Department should work both to ensure equitable access to education for all of our nation’s students and to promote support for education to the general public. Both of these factors are essential to ensuring that improvements in math and science education reach all students, regardless of income level, geographic location, or ethnic or minority status.

Recruitment of Math and Science Teachers

Although today's hearing focuses primarily on professional development and curriculum to strengthen math and science education, I would like to offer one additional thought regarding recruiting quality math and science teachers, particularly from the private sector. Two current provisions of Social Security law – the Government Pension Offset (GPO) and Windfall Elimination Provision (WEP) – are undermining efforts to attract quality teachers. The WEP in particular is a disincentive for individuals to move from the private sector into teaching, as it cuts significantly the Social Security benefits they can receive from their private sector job. The GPO and WEP have the most impact in 15 states where teachers do not pay into Social Security, including large states such as California, Texas, and Illinois. Repeal of these offsets is a top priority for NEA and should be part of any initiative to attract quality math and science teachers.

Conclusion

Improving math and science education is vital to the future strength of our nation and to the ability of our future workforce to compete in the global economy. Ensuring quality teachers is the single most important element to address if we are to reach this goal.

Therefore, NEA recommends:

- Focusing efforts to improve math and science education on professional development for new and veteran teachers.
- Continuing and expanding funding for NSF's Mathematics Science Partnership Programs to allow new partnerships.
- Allowing NSF to take the lead and partner with the Department of Education in professional development and curriculum design.

I thank you for the opportunity to provide this testimony to you today and look forward to working with the committee on these important issues.

APPENDIX: Guidelines for Quality Professional Development

From Current Elementary and Secondary Education Act:

Sec. 9101(34) PROFESSIONAL DEVELOPMENT- The term professional development' —

(A) includes activities that —

- (i) improve and increase teachers' knowledge of the academic subjects the teachers teach, and enable teachers to become highly qualified;
- (ii) are an integral part of broad schoolwide and districtwide educational improvement plans;
- (iii) give teachers, principals, and administrators the knowledge and skills to provide students with the opportunity to meet challenging State academic content standards and student academic achievement standards;
- (iv) improve classroom management skills;
- (v) (I) are high quality, sustained, intensive, and classroom-focused in order to have a positive and lasting impact on classroom instruction and the teacher's performance in the classroom; and
(II) are not 1-day or short-term workshops or conferences;
- (vi) support the recruiting, hiring, and training of highly qualified teachers, including teachers who became highly qualified through State and local alternative routes to certification;
- (vii) advance teacher understanding of effective instructional strategies that are —
 - (I) based on scientifically based research (except that this subclause shall not apply to activities carried out under part D of title II); and
 - (II) strategies for improving student academic achievement or substantially increasing the knowledge and teaching skills of teachers; and
- (viii) are aligned with and directly related to —
 - (I) State academic content standards, student academic achievement standards, and assessments; and
 - (II) the curricula and programs tied to the standards described in subclause (I) except that this subclause shall not apply to activities described in clauses (ii) and (iii) of section 2123(3)(B);
- (ix) are developed with extensive participation of teachers, principals, parents, and administrators of schools to be served under this Act;
- (x) are designed to give teachers of limited English proficient children, and other teachers and instructional staff, the knowledge and skills to provide instruction and appropriate language and academic support services to those children, including the appropriate use of curricula and assessments;
- (xi) to the extent appropriate, provide training for teachers and principals in the use of technology so that technology and technology applications are effectively used in the classroom to improve teaching and learning in the curricula and core academic subjects in which the teachers teach;
- (xii) as a whole, are regularly evaluated for their impact on increased teacher effectiveness and improved student academic achievement, with the findings of the evaluations used to improve the quality of professional development;
- (xiii) provide instruction in methods of teaching children with special needs;
- (xiv) include instruction in the use of data and assessments to inform and instruct classroom practice; and
- (xv) include instruction in ways that teachers, principals, pupil services personnel, and school administrators may work more effectively with parents; and

(B) may include activities that —

- (i) involve the forming of partnerships with institutions of higher education to establish school-based teacher training programs that provide prospective teachers and beginning teachers with an opportunity to work under the guidance of experienced teachers and college faculty;
- (ii) create programs to enable paraprofessionals (assisting teachers employed by a local educational agency receiving assistance under part A of title I) to obtain the education necessary for those paraprofessionals to become certified and licensed teachers; and
- (iii) provide follow-up training to teachers who have participated in activities described in subparagraph (A) or another clause of this subparagraph that are designed to ensure that the knowledge and skills learned by the teachers are implemented in the classroom.

National Staff Development Council Standards for Staff Development

(Revised, 2001)

Context Standards

Staff development that improves the learning of all students:

- Organizes adults into learning communities whose goals are aligned with those of the school and district. (Learning Communities)
- Requires skillful school and district leaders who guide continuous instructional improvement. (Leadership)
- Requires resources to support adult learning and collaboration. (Resources)

Process Standards

Staff development that improves the learning of all students:

- Uses disaggregated student data to determine adult learning priorities, monitor progress, and help sustain continuous improvement. (Data-Driven)
- Uses multiple sources of information to guide improvement and demonstrate its impact. (Evaluation)
- Prepares educators to apply research to decision making. (Research-Based)
- Uses learning strategies appropriate to the intended goal. (Design)
- Applies knowledge about human learning and change. (Learning)
- Provides educators with the knowledge and skills to collaborate. (Collaboration)

Content Standards

Staff development that improves the learning of all students:

- Prepares educators to understand and appreciate all students, create safe, orderly, and supportive learning environments, and hold high expectations for their academic achievement. (Equity)
- Deepens educators' content knowledge, provides them with research-based instructional strategies to assist students in meeting rigorous academic standards, and prepares them to use various types of classroom assessments appropriately. (Quality Teaching)
- Provides educators with knowledge and skills to involve families and other stakeholders appropriately. (Family Involvement)

